

CLAIMS

1. A device for rotating inside of a disk player and / or recorder a disk shaped data carrier having an opening around a center of said disk shaped carrier, said device comprising at least

- fixing means which allow to removably fix said disk by inserting a part of said fixing means in said opening,
- driving means which rotate said data carrier by acting on said fixing means, said driving means being at least partly mechanically connected to said disk player and / or recorder,
- side moving means which allow said fixing means to move inside said player and / or recorder in a rotation plane substantially perpendicular to an axis of rotation of said fixing means.

2. A device according to claim 1 wherein said side moving means comprise

- sliding means which allow to move said driving means inside said player and / or recorder along directions which are parallel to said rotation plane, and
- elastical elongation means fixed at one end to said player and / or recorder and at another end to said driving means, such that said driving means are positioned in a determined rest position at least when said driving means stop driving said data carrier.

3. A device according to claim 1 wherein said side moving means further comprise

- flexible transmission means through which said driving means act on said fixing means, an end of which is connected to said driving means and another end of which is connected to said fixing means.

4. A device according to claim 3 wherein said side moving means comprise first bearing means, said first bearing means being mounted on said fixing means, and said disk and / or recorder comprises at least a supporting surface being parallel to said rotation plane, such that said first bearing means allow said fixing means to slide on said supporting surface while said fixing means rotate.

5. A device according to claim 3 wherein said moving means further comprise a sliding support and said disk player and / or recorder comprises at least a supporting surface being parallel to said rotation plane, such that said sliding support slides on said supporting surface, said sliding support having a drive opening through which said driving means act on said fixing means.
6. A device according to claim 5 characterized in that at least an elongated part of said fixing means is fitted through said drive opening together with second bearing means which allow said elongated part to rotate inside said drive opening, said elongated part being connected to said other end of said flexible transmission means.
7. A device according to claim 6 further comprising centering means which position said fixing means in a central position at least when said driving means stop driving said data carrier.
8. A device according to claim 1, wherein said side moving means comprise
- a sliding support having a drive opening through which said driving means act on said fixing means,
- and said disk and / or recorder comprises at least
- a supporting surface being parallel to said rotation plane, such that said sliding support slides on said supporting surface,
- said fixing means further comprising
- an elongated part fitted through said drive opening together with second bearing means which allow said elongated part to rotate inside said drive opening, and said driving means comprising
 - a rotor magnet mounted on said elongated part and a stator electro-magnet mounted on said player and / or recorder such that said rotor magnet and said stator electro-magnet cooperate as an electric motor,
- said device further comprising
- centering means which position said fixing means in a central position at least when said driving means stop driving said data carrier.

9. A device for rotating inside of a disk player and / or recorder a disk shaped data carrier having an opening around a center of said disk shaped carrier, said device comprising at least

- fixing means which allow to removably fix said disk by inserting a part of said fixing means in said opening said fixing means comprising an elongated part,
- driving means which rotate said data carrier by acting on said fixing means, said driving means being at least partly mechanically connected to said disk player and / or recorder, and said driving means comprising a rotor magnet which is mounted on said elongated part and a stator electro-magnet mounted on said player and / or recorder such that said rotor magnet and said stator electro-magnet cooperate as an electric motor,
- centering means which position said fixing means in a central position at least when said driving means stop driving said data carrier.

10. A device according to claim 9 wherein said rotor magnet is repulsed at a determined distance from said stator electro-magnet by magnetic forces at least when said driving means drive said data carrier.

11. A device according to claim 9 wherein said elongated part has a point contact with said player and / or recorder such that said rotation axis passes through said point contact.

12. A device for rotating inside of a disk player and / or recorder a disk shaped data carrier having an opening around a center of said disk shaped carrier, said device comprising at least

- fixing means which allow to removably fix said disk by inserting a part of said fixing means in said opening,
- driving means for generating a driving force to rotate said data carrier, said driving means being at least partly mechanically connected to said disk player and / or recorder, and comprising compressor means to generate a stream of air and canalization means to direct said stream of air onto a surface which belongs to said data carrier and / or said fixing means such that a driving force is transmitted to said data carrier which sets said data carrier into

rotation and such that an air cushion lifts said data carrier and said fixing means thus reducing mechanical friction between said fixing means and said driving means,

- centering means which position said fixing means in a central position at least when said driving means stop driving said data carrier.

13. A device according to claim 12 wherein

- said canalization means comprise,
 - a first tube, at one end of which said stream of air enters, and at another end of which at least part of said stream of air exits, and
- said fixing means comprise
 - a second tube in which at least a part of said first tube including said other end of said first tube may be inserted,
 - central openings for receiving at least part of said stream of air and which present said surfaces to said part of said stream of air.

14. Device according to claim 13 wherein said central openings and said surfaces form a turbine or propeller.

15. A device according to claim 12 wherein said canalization means comprise a multiplicity of nozzles, an end of each nozzle receiving a part of said stream of air and another end of each nozzle directing air to said data carrier which presents said surface to said stream of air.

16. A device according to claim 15 wherein

- said canalization means further comprise
 - a centering tube an opening of which receives a part of said stream of air, and which has further nozzles which allow air to exit from an inside to a periphery of said centering tube, and in that
- said fixing means comprise
 - a further centering tube into which a part of said centering tube including said further nozzles may be fitted such that the air flowing

from said further nozzles allows to preserve an air cushion between an inner surface of said further centering tube and said centering tube.

17. A device according to claim 8, wherein said centering means comprise a conical recess which receives a tip shaped extremity from said fixing means, and are elastically mounted to said player and / or recorder.

18. A device according to claim 10, wherein said elongated part has a point contact with said player and/or recorder such that said rotation axis passes through said point contact.

19. A device according to claim 9, wherein said centering means comprise a conical recess which receives a tip shaped extremity from said fixing means, and are elastically mounted to said player and / or recorder.

20. A device according to claim 12, wherein said centering means comprise a conical recess which receives a tip shaped extremity from said fixing means, and are elastically mounted to said player and / or recorder.